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for removing gases outgassed from the softened reformed fused silica.

78. A method for producing silica grain comprising providing a chamber, providing a [illegible] connected to the chamber, and withdrawing unwanted gasses, providing a valved vacuum line connected to the chamber and reducing pressure in the chamber, providing a valved gas inlet connected to the chamber and introducing inert gas into the chamber, providing at least one heater connected to the chamber and forming a hot plasma in the chamber, providing a silica powder source connected to the chamber and supplying silica powder to the hot plasma in the chamber, heating, softening, drying and removing OH, and agglomerating powder particles into larger silica grains and providing a collector in the chamber for collecting the silica grains.

79. The method of claim 78, further comprising positioning the collector in the chamber beneath the plasma.

80. The method of claim 79, further comprising providing a moving device connected to the collector and rotating the collector and raising and lowering the collector.

81. The method of claim 80, further comprising locating the valved vacuum line downward in the chamber and creating a differential pressure in the chamber with higher pressures toward a top of the chamber and lower pressures near a bottom of the chamber.

82. The method of claim 81, further comprising centering the plasma in the chamber above the collector.

83. The method of claim 82, further comprising connecting the silica powder source to the chamber above the plasma.

84. The method of claim 83, wherein the providing the silica powder source comprises providing small grain silica powder introduction ports near a top of the chamber.

85. The method of claim 83, wherein the providing the silica powder source comprises providing a plurality of burners connected to the top of the chamber, burning silica precursors in the chamber and generating the silica powder in the chamber.

86. The method of claim 83, wherein the providing the silica powder source comprises providing small grain silica powder introduction ports at a top of the chamber and providing a plurality of burners connected to the top of the chamber, burning silica precursors in the chamber and generating the silica powder in the chamber.

87. The method of claim 86, wherein the supplying the silica powder comprises introducing the silica powder together with a gas plasma or a plasma/neutral gas mixture.

88. The method of claim 78, further comprising positioning the gas inlet in the chamber opposite the plasma and providing inert gas to the plasma.

89. The method of claim 78, wherein the introducing the inert gas comprises introducing pure inert gas.

90. The method of claim 78, wherein the introducing the inert gas comprises introducing an inert gas mixed with other inert gasses.

91. The method of claim 78, wherein the introducing the inert gas comprises introducing an inert gas mixed with reactive gas for additional silica powder purification

92. The method of claim 78, wherein providing the collector comprises providing a heated holder, holding the silica grains on the holder, and further comprising providing a purging, reactive or dopant gas input line connected to the heated holder and passing purging, reacting, or dopant gas through the silica grains on the heated holder.

93. The method of claim 92, wherein the providing the purging reactive or dopant gas comprises providing chemically reactive gas, plasma or gas plasma and neutral mix.

94. The method of claim 92, further comprising providing a second vacuum chamber below the first chamber.

95. The method of claim 92, wherein the providing the heated holder further comprises providing a crucible, and softening, fusing and flowing the silica.

96. The method of claim 95, further comprising providing a flow director connected to the crucible and flowing the fused softened silica from the crucible

to the crucible and flowing the fused softened silica from the crucible.

97. The method of claim 95, further comprising providing a seal and a puller connected to the chamber and pulling the flowing fused silica from the chamber.

98. The method of claim 78, further comprising providing multiple heat zones in the chamber and heating the zones to different temperatures.

99. The method of claim 97, wherein providing the multiple heat zones further comprises providing plural heat zones adjacent the plasma and heating the plasma in the distinct heat zones.

100. The method of claim 98, wherein the providing the multiple heat zones comprises providing plural microwave heaters and heating the plasma in distinct heat zones.

101. The method of claim 78, wherein the providing the at least one heater comprises providing plural microwave heaters and heating the chamber in distinct heat zones.

102. The method of claim 78, wherein the providing the at least one heater comprises providing plural radio frequency heaters and heating the plasma in distinct heat zones.

103. The method of claim 78, wherein the providing the at least one heater comprises providing resistive, RF and IR heaters and heating the chamber in distinct heat zones.

104. The method of claim 78, wherein the providing the at least one heater comprises providing resistive, RF and IR heaters and heating the plasma in distinct heat zones.

105. The method of claim 78, wherein the forming a hot plasma comprises providing a plurality of microwave plasma generators for producing plasma for the chamber.

106. The method of claim 97, further comprising providing a gas plasma surface removal unit mounted beneath the seal and puller and finishing a surface of the tube being pulled from the chamber.

107. The method of claim 78, further comprising providing a plate/bar fabrication vacuum chamber having an input connected to an output of the first chamber, providing on the fabrication chamber a plurality of valved vacuum ports, gas inlet ports, vent ports, providing a fused silica feed material introduction port, as the input, providing resistance or RF heating connected through a plurality of feedthroughs, providing a crucible tray made from graphite, silicon carbide, ceramic material, metal or metal alloys for receiving the feed material from the first chamber, softening and solidifying of the material in the crucible tray, providing a plurality of ultrasound or other oscillation generators in contact with the crucible tray for promoting proper mixing and outgassing, and providing additional vacuum ports above the softened materials for removing any gas bubbles.

108. The method of claim 107, wherein providing the fabrication chamber comprises providing a plurality of fabrication chambers.

119. A method for providing fused silica grains, comprising providing an elongated chamber, providing a pressure control connected to the chamber, controlling pressure in the chamber, providing at least one collector mounted in the chamber, disposing silica particle providers connected to the chamber and supplying doped and undoped silica particles in the chamber, and directing the silica particles toward the at least one collector, providing at least one heater connected to the chamber, supplying heat to the collector and supplying heat to the chamber, directing heat to the silica particles, softening surfaces of the particles, sticking and agglomerating the particles with other heated particles, and with the collector and collecting the particles.

120. The method of claim 119, further comprising providing a rotation assembly mounted on the chamber, connecting the rotating assembly to the at least one collector and relatively rotating the collector with respect to the chamber.

121. The method of claim 119, wherein the providing the pressure control comprises providing at least one reduced pressure port in the chamber and venting and withdrawing gas.

122. The method of claim 119, further comprising providing at least one inlet port in the chamber and introducing purgant, dopant or oxidant gas into the chamber.

123. The method of claim 119, wherein providing the at least one heater comprises providing at least one radiant heater in the chamber and directing heat to the silica particles in the

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providing at least one radiant heater in the chamber and directing heat to the silica particles in the chamber.

124. The method of claim 119, wherein providing the at least one heater comprises providing a radio frequency heater in the chamber and directing heat to the substrate, the preform and the particles in the chamber.

125. The method of claim 119, wherein providing the at least one heater comprises providing a microwave gas plasma generator.

126. The method of claim 119, wherein providing the at least one heater comprises providing plural heaters in the chamber and heating plural heat zones along the elongated chamber.

127. The method of claim 119, further comprising providing a translation mechanism connected to the chamber and the collector and relatively translating the collector with respect to the chamber.

128. The method of claim 119, wherein the disposing the silica particle providers comprises providing burners for introducing and pyrolyzing or oxidizing compounds in the chamber and providing the silica particles in the chamber.

129. The method of claim 119, wherein the disposing the silica particle providers comprise providing silica powder stream injectors in the chamber and directing preformed silica powder toward the collector.

130. The method of claim 119, further comprising providing a crucible with a heated throat fusing and softening the silica and an open lower end and flowing the softened fused silica.

131. The method of claim 130, further comprising providing a rotating and pulling mechanism near a lower end of the chamber and rotating and pulling the softened fused silica from the chamber.

132. The method of claim 131, wherein pulling the softened and fused silica comprises pulling the silica from the chamber as a tube.

133. The method of claim 131, wherein pulling the softened and fused silica comprises pulling the silica from the chamber as a rod.

134. The method of claim 131, wherein providing the at least one heater further comprises providing a resistance heater connected to the crucible and softening fused silica in the crucible.

135. The method of claim 137, further comprising providing electrodes near the softened silica, providing an electric field generator connected to the electrodes and providing an electric field in the softened silica.

136. The method of claim 135, wherein the providing the electrodes comprises providing at least one of the electrodes on one side of the softened silica, providing at least one other of the electrodes on an opposite side of the softened silica and providing the electric field through the softened silica.

137. The method of claim 136, wherein the flowing the softened silica comprises forming a tubular bubble, wherein the providing the electrodes comprises providing the at least one of the electrodes outside of the tubular bubble, and providing the at least one other of the electrodes within the tubular bubble.

138. The method of claim 137, wherein the providing the electrodes comprises providing concentric ring electrodes.

139. The method of claim 131, further comprising providing a second chamber providing a crucible tray, receiving the softened silica from the first chamber, and providing at least one second chamber heater in the second chamber, heating the fused softened silica and reforming the silica in a desired form in the crucible tray.

140. The method of claim 139, further comprising providing ultrasound or other oscillation generators in the second chamber adjacent the crucible tray and outgassing gas from the softened reformed fused silica.

141. The method of claim 140, further comprising providing additional vacuum ports

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providing a crucible tray, receiving the softened silica from the first chamber, and providing at least one second chamber heater in the second chamber, heating the fused softened silica and reforming the silica in a desired form in the crucible tray.

140. The method of claim 139, further comprising providing ultrasound or other oscillation generators in the second chamber adjacent the crucible tray and outgassing gas from the softened reformed fused silica.

141. The method of claim 140, further comprising providing additional vacuum ports near the crucible tray and removing gases outgassed from the softened reformed fused silica.

142. The method of claim 119, wherein the disposing comprises mounting the particle providers in an upper part of the chamber and directing particles inward into a mass of particles, wherein providing the at least one heater comprises providing a resistive, radio frequency, plasma or other heater and heating particles and softening surfaces of the particles in the mass of particles, and wherein the providing the collector comprises providing a first heated crucible positioned with respect to the mass of particles collecting softened particles and agglomerations of softened surface particles from the mass in the first heated crucible, providing a lower throat, heating the throat, softening, fusing and flowing fused silica from the first crucible through the throat.

143. The method of claim 142, further comprising providing a flow director mounted beneath the lower heated throat and flowing of the flowing fused silica as a tubular or solid member having round, rectangular or polygonal cross-section.

144. The method of claim 143, further comprising connecting a purging or dopant injector to the flow director and supplying purging gas and dopant to the flowing fused silica.

145. The method of claim 143, further comprising positioning a second crucible below the heated throat and receiving flowing fused silica, and providing a purging gas or dopant injector in the second crucible and injecting purging gas or dopant in the fused silica in the second crucible.

146. The method of claim 149, further comprising providing a second chamber providing a crucible tray in the second chamber, receiving the softened silica from the first chamber in the crucible tray, and providing at least one second chamber heater in the second chamber, heating the fused softened silica and reforming the silica in a desired form in the crucible tray.

147. The method of claim 146, further comprising providing ultrasound or other oscillation generators in the second chamber adjacent the crucible tray and outgassing gas from the softened reformed fused silica.

148. The method of claim 147, further comprising providing additional vacuum ports near the crucible tray and removing gases outgassed from the softened reformed fused silica.